

Show all your work whenever there are formulas and computations involved!

1. A problem has an exact value of $x = 0.3479$.
 - (a) Write down the exact value of x in the form $a \cdot 10^k$, where k is an integer and $1 \leq a < 10$.
 - (b) State the value of x correct to **two** significant figures
 - (c) Calculate the percentage error if x is given correct to **two** significant figures.

2. A science teacher is writing a test for her Chemistry class. The test will have true and false questions worth 5 points each and multiple choice questions worth 10 points each for a total of 200 points. He wants to have twice as many multiple choice questions as true and false questions.
 - (a) Let **a** represent the number of true and false questions and **b** represent the number of multiple choice questions. Write a system of equations that represents the number of each type of question.
 - (b) How many true and false questions and how many multiple choice questions will be on the test?

3.
 - (a) The first term of an arithmetic sequence is 18 and the fifth term is 12. Calculate the value of the common difference (d).
 - (b) The third term of a geometric sequence is 0.5 and the seventh term is 40.5. All the terms in the sequence are positive. Calculate the value of the common ratio(r) and the value of the first term of the sequence (u_1).

4. (a) Convert 0.003854 metres to millimetres (mm). Give your answer to the nearest mm.

The acceleration of an object has units measured in metres per second squared.

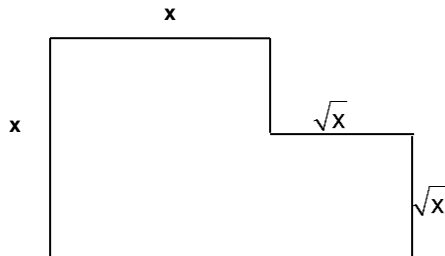
- (b) Write down the symbol used to show acceleration.

In the SI system, force is measured in newtons. The force needed to produce an acceleration, a , on an object with mass (kg), m , is given by $F = m \cdot a$, where F is measured. This is Newton's second law.

- (c) Write down the correct combination of SI units (m, kg, s) for force.

- (d) Calculate the force needed to cause an acceleration of 20 ms^{-2} on a soccer ball that has a mass of 0.450kg.

5. A swimming pool is to be built in the shape of a letter L. The shape is formed from two squares with side dimensions x and \sqrt{x} as shown.



Not drawn to scale.

- (a) Write down an expression for the area, A , of the swimming pool surface.
- (b) The area, A , is to be 56m^2 . Write a quadratic equation that expresses this information.
- (c) Find both the solutions of your equation in part **b**.
- (d) Which of the solutions in part **c** is the correct value of x for the pool? State briefly why you made this choice.

6. (a) Given $x = 3.7 \times 10^{-3}$ and $y = 4.0 \times 10^6$, calculate the value of $w = x \cdot y$. Give your answer in the form $a \cdot 10^k$, where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

- (b) State to which of the following number sets \mathbb{N} , \mathbb{Z} , \mathbb{Q} , \mathbb{R} each value belongs.

i. x

ii. y

iii. w

iv. $x + y$

v. $\frac{1}{w}$

7. In 2000 Traci joined a swim club. The fees were £600 a year. Each year the fees increase by 6%.

- (a) Calculate, **to the nearest £1**, the fees in 2003.

- (b) Calculate the total fees for Traci who joined the swim club and remained a member for seven years. (she starts as a member in 2000)

8. A woman deposits \$200 into her son's savings account on his first birthday. On his second birthday she deposits \$250, \$300 on his third birthday, and so on.

- (a) How much money would she deposit into her son's account on his 15th birthday?

- (b) How much in total would she have deposited after her son's 15th birthday?

9. (i) The n th term of an arithmetic sequence is given by $u_n = 85 - 7n$.

- (a) Calculate the values of the first two terms of this sequence.

- (b) Which term of the sequence is -83?

- (c) consecutive terms of this sequence, u_k and u_{k+1} , have a sum of 37. Find k .

9. (ii) A racketball is dropped vertically. It reaches a height of 6 feet on the first bounce. The height of each subsequent bounce is 90% of the previous bounce.

(a) What height does it reach on the seventh bounce?

(b) What is the total vertical distance traveled by the ball between the first and sixth time the ball hits the ground?

10. The cost of boring a well 300 metres deep is calculated from the following information:

The cost for the first metre is \$20.00, and then the cost per metre increases by \$2.00 for every subsequent metre.

Find:

(a) the cost of boring the 300th metre;

(b) the total cost of boring the well.